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Optimization methods.

Local, e.g. *IRLS*

may be several extrema

move in discrete jumps

variant
check to see if next location actually improvement
if not, pull back closer to current (Fletcher-Powell)

Global

simulated annealing
exponential probability jumps
exceedingly slow

genetic algorithms
stochasic
crossing rules, e.g. interchange of coordinates
slow

smoothing
local extrema disappear
then, add more detail

branch and bound
more reliable

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Properties for ψ.

Want:

1. High breakdown point

breakdown point – the smallest proportion of contamination that can force a description off to arbitrary values

mean, $\beta = 0$; median, $\beta = .5$, trimmed mean, $\beta = \gamma$

2. ψ bounded
   controls influence of datum

3. ψ moderately continuous
   insensitive to small shifts

4. ψ has rejection point
   deletes extreme outliers

5. ψ adapted to problem

6. $\psi(r)$ approx linear for small r
   good for bell-shaped

7. $\psi(-r) = - \psi(r)$

center clear